CHAPTER I

INTRODUCTION

A. Background

The fact is that the quality and efficiency of roads have an effect the quality of life, health of the social system and the progress of the economic and business activity. Catastrophic defects of these roads may occur because of aging, overuse, misuse and/or mismanagement. Thus, maintenance and preservation should be a government priority.

Climatic factors and traffic volume overwhelmingly affect road infrastructure and reduces road quality. As the indicator can be seen from the road surface behavior, both structural and functional conditions suffer damage. Road surface behavior needs to be monitored to determine the condition of the road surface which may have suffered the damage. Drainage imperfections quickens pavement distresses which causes structural failures. First stages of research on the condition of the road surface is carried out visually by looking and analyzing the damage based on the category and extent of the damage to use as a basis for carrying out maintenance and repair activities.

Assessment of the damages is done to categorize them, and to analyze the extent of pavement damage due to unforeseen conditions and plan for the repairs and maintenance. Analysis of pavement damage density is a crucial part in determining road maintenance and repair. To analyze the density of the pavement damage, it is necessary to first determine the types, causes, and extent of the damage that occurred.

The significance of a desirable road pavement construction condition is assumed to be able to uphold the requirements of climate condition, traffic and structural. For the thick pavements, damage and therefore repair and maintenance is primarily traffic related. For the lighter rural pavement, it is mainly climate related plus incompetent road construction.

The structural requirements of road pavement construction are said to be met from the ability to withstand and spread the load and also to resist the climatic change effects. The defined streets segments do not fulfill these known conditions due to the damages suffered.

The two major types of climate related risks faced by road infrastructure are: Long-term changes in the climate, particularly temperature and precipitation; and “Shock events” such as flooding and landslides which are continuously occurring with increased frequency and intensity. To address these problems, governments need to adapt to the way they operate, maintain, upgrade, and expand the many assets that make up a road network.

To meet demands of formulating a good maintenance system, the Department of Public Transport has developed a road maintenance system National and Provincial Roads supported by the designed equipment specifically for this activity, namely Routine Maintenance Unit (UPR). In order to arrange a routine maintenance program and handling, complete field data support is required and it is obtained through a survey of road conditions. The road condition survey is carried out by looking directly at the category and type of damage, so the results acquired from such observations may provide accurate and reliable data determined how to fix it.

B. Problem Statement

Given the above background, the problems in this research can be compiled as follows:

1. What is the category and type of damage that occurred on the defined streets segments?
2. What is the result of the road damage density and value due to climatic factors that occurred on the defined streets segments?
3. What is the quality and condition of drainage system in the defined streets segments?
4. What is the Result of the road damage density and value due to Heavy Vehicle load that occurred on the defined streets segments?

C. Objectives of Research

1. To determine and analyze the road damage density on the afore mentioned road segment, type, dimension and severity.
2. To examine the quality of drainage on the definitive road segment.
3. To examine the Heavy Vehicle load factor on the definitive road segment.
4. To examine road damage density due to water factor.

D. Product Knowledge and Output

This research is targeting to analyze the relationship of road damage due to climate, load and drainage quality to better the road segments so as to provide desired levels of service.

E. Benefits of Research

Learning and categorizing the types of road pavement damages, and to examine the extent of pavement damage due to climate and other factors and efforts to maintain the road structure. Assessment of pavement damage density is a crucial aspect in terms of determining road maintenance and repair activities. To examine the density of the pavement damage, it is advisable to first determine the types, causes, and extent of the damage that occurred.

F. Research Limitation

The limitations of this research are:

1. For alternative handling of road damage with Bina Marga method from the Directorate General of Highways.
2. This research was conducted on flexible pavement only.
3. Use analysis method with excel application only.
4. Bad weather, heavy traffic.

G. Originality of Research

Based on the author's knowledge, this research has not been conducted before. However, similar research has been done by Darmawan (2005) about Road Damage Evaluation and Alternative Handling with Approach of Bina Marga Method (Case Study of Sragen – Gemolong Road Section Km 5 + 500 – Km 16 + 500). Another similar study has been conducted by Budiyono (2012) under the title "Analisa Kerusakan Jalan Dengan Metode PCI Dan Alternatif Penyelesaiannya (Studi Kasus Ruas Jalan Purwodadi – Solo Km 12+000 – Km 24+000)".Another similar study has been conducted by Ihab Al-Smadi (2018) under the title "Road Damage Analysis With PCI Method And Alternative Solutions (Case Study Joint) Streets of Adi Sumarmo - Solo Km 0+000 - Km 2+000)".The

similarities and differences with the previous research:

1. Similarities with Similar Research

   This research is actually new but it's similar to a previous research, the similarity is mainly to the survey method used.

2. Differences with Similar Research

   In this study, the data is taken from Solo-Purwodadi Street in Surakarta city in December 2019 and just calculating the density of the road damage due to climatic factors, analyzing the drainage quality and the load of the heavy vehicles which is different from the latest concluded research of Anas Majdi (2018).